Elimination-Dispersal Sine Cosine Algorithm for a Dynamic Modelling of a Twin Rotor System

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Abstract:
This paper presents an improved version of Sine Cosine Algorithm (SCA). The original SCA is a simple algorithm and it offers a good accuracy. However, for some problems and fitness landscapes, the accuracy achievement of the algorithm is not at optimal. Search agents of the algorithm stuck at the local optima. The proposed new algorithm which is called an EliminationDispersal Sine-Cosine Algorithm adopts Elimination–Dispersal (ED) strategy from Bacterial Foraging Algorithm. The ED helps search agents to solve the local optima problem. At the same time, an elitism approach is applied in the proposed algorithm. The elitism ensures some agents continue the next search operation from the currently best found solution. The proposed algorithm is tested on CEC2014 benchmark functions that have various fitness landscapes and properties. The accuracy performance is compared with the original SCA and analyzed. It also is applied to acquire and optimize a dynamic model for a Twin Rotor System (TRS). Result of the modelling shows that the proposed algorithm achieves a better accuracy and thus present less modelling error and better dynamic response for the TRS.

Keywords : Elimination-dispersal, Sine Cosine Algorithm, Twin rotor system, dynamic modelling, system identification.

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